

data formed by the focussing portion **28**, and even more particularly from the luminance data that refers to the secondary areas **I2** that are to be blurred. One criterion for the definition of the coefficients of the mask can then be, for example, that the blurring should be made to create “an even grey”, thus avoiding the creation of a background that becomes too dark or too light. As is known, as a result of convolution, the pixel values that are greater or less than the extremes of the luminance scale are generally cut to the extremes of the scale (for example, to zero, or to the value 255, if the depth is 8-bit). In order to avoid this kind of cutting to the extremes, the coefficients of the convoluting mask are attempted to be made to be adapted, using the focussing data, to be such that cutting of this kind does not occur. According to a second embodiment, blurring can also be made in such a way that noise is strongly mixed with the background area, or the secondary areas **I2** in general, after which the background (i.e. noise) is low-pass filtered to become even. This too can be handled by the code **31.2**. When applying coefficients in the filtering, the focussed area **I1** is made to remain untouched, i.e. sharp. In part, this is caused in such a way that the areas of the primary image objects **I1** are not processed at all, but only the inessential areas **I2** are processed. Correspondingly, as a result of the coefficients, the sharpness of the areas **I1** remaining outside of the focussing area, i.e. the secondary areas in the context of the invention, is then reduced.

[0047] On the other hand, suitable groups of filtering coefficients groups, i.e. masks, using which filtering is then performed, can also be prearranged in the device **10**. Stated in more general terms, the device **10** can provide filtering coefficients, either by calculating them on the fly, or by providing them from a “coefficient bank” prearranged in the memory MEM.

[0048] Even more particularly, an area can also be taken into account, for example, in stage **303**, in such a way that the edge and/or shape information of the primary image object **I1** can be applied to select a non-rectangular shape. In the device **10** there can also be different kinds of precalculated area shapes. An attempt can be made to apply them to the selected primary image object and then select/use the one that fits best. As some examples of these may be mentioned rectangular, circular, elliptical, and triangular areas FA. Among other things, the use of precalculated areas FA brings an advantage in the use of the processing power of the device **10**, because, in the case of area shapes that are frequently repeated, there is no need to perform the calculation again. There are code means **31.4** in the program code **31**, for performing this operation.

[0049] The result, after the operations according to the invention, is an image, which are limited depth of focus. As final stages **308-310**, the image data ID is compressed and stored on the desired medium **19**.

[0050] FIG. 2 shows a rough schematic diagram of one example of a program product **30** according to the invention. The program product **30** can include a storage medium MEM and program code **31**, written on the storage medium MEM, to be executed using the processor means CPU of the device **10**, for implementing blurring according to the method of the invention at least partly on a software level. The storage medium MEM of the program code **31** can be, for example, a static or dynamic application memory in the device **10**, or a blurring-circuit module totality being in the imaging chain IC, with which it can be directly integrated.

[0051] The program code **31** can include several code means **31.1-31.5** to be executed by the processor means, the operation of which can be applied in the method descriptions given immediately above. The code means **31.1-31.5** can consist of a group of processor commands to be performed consecutively, by means of which the functionalities desired, in terms of the invention, are created in the device **10** according to the invention.

[0052] Owing to the invention, a background blurring effect can be implemented in small digital cameras too, surprisingly already in the imaging stage, without any need for difficult post-processing. One example of an area of application of the invention can be the blurring of the background in portraits. In portrait applications may be additionally applied face recognition on basis of which the focus area and the background area to be blurred may be calculated. For the recognition may be used the color of the face which can usually be easily recognized by the algorithms known as such. The case-specific calculation of filtering coefficients will achieve the most suitable background/blurring for each imaging target IT.

[0053] Though the invention is largely described above as a still-imaging application, it can, of course, also be applied video imaging, as well as to viewfinder imaging performed before the imaging for storing. In video imaging, it should be understood that the flow chart of FIG. 3 will then form a continuous loop, in which imaging, focussing, and blurring can be performed as a continuous process (from block **305** the procedure also moves to block **302**). In any event, the imaging for storing is performed whether the focussing is then optimal or not (in stage **304**, the procedure moves in the directions of the yes and no arrows). The focussing is iterated automatically to become correct by adjusting the optics **14**, without, however, interrupting imaging.

[0054] It must be understood that the above description and the related figures are only intended to illustrate the present invention. The invention is thus in no way restricted to only the embodiments disclosed or stated in the Claims, but many different variations and adaptations of the invention, which are possible within the scope of the inventive idea defined in the accompanying Claims, will be obvious to one versed in the art.

1-22. (canceled)

23. An apparatus comprising:

at least one processor; and

at least one non-transitory memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus at least to perform:

form image data, with a camera, from an imaging target including at least one primary image object and at least one secondary image object, the camera comprising an image sensor and an analog to digital converter configured to convert the imaging target to image data,

process, with an image-processing chain arranged in connection with the camera, the image data formed from the imaging target,

focus, with a focussing circuit, the camera on at least one primary image object and to determine statistics information of the image data received from the camera,

define, with the at least one processor, more than one primary image object in the image data and to define